## **HUMAN RESOURCES FOR TREATING NEW CANCER CASES IN CHINA**

## **Executive Summary**

The purpose of this report is to describe the human resources needed in China to treat new cancer patients.

The population of China is approximately 1.34 billion (697.56 million men and 647.33 million women) and the estimated number of new cancer cases in China for the year 2008, based on Globocan data for China as a whole (http://globocan.iarc.fr/) was 2817210 (1622502 in men and 1194708 in women) (Table A). The five most common cancers in China are (1) lung, (2) stomach, (3) liver, (4) esophagus and (5) colorectal.

Table A: The ten most frequently occurring cancers in China for men and women based on 2008 Globocan data (http://globocan.iarc.fr/).

Cancer	Both	Rank	Men	Rank	Women	Rank
All cancers excl. non-melanoma skin cancer	2817210		1622502		1194708	
Lung	522050	1	351713	1	170337	2
Stomach	464439	2	315843	2	148596	4
Liver	402208	3	292966	3	109242	5
Esophagus	259235	4	175863	4	83372	7
Colorectal	221313	5	125461	5	95852	6
Gynecological	190239	6			190239	1
Breast	169452	7			169452	3
Urological	124032	8	100552	6	23480	11
Hematological	114351	9	64854	7	49497	8
Head and Neck	98253	10	60622	8	37631	9
Brain, nervous system	66454	11	33244	9	33210	10
Pancreas	44217	12	24841	10	19376	12

Newly diagnosed cancer patients need pathology, surgery, chemotherapy and/or radiation therapy. The number of oncologists needed is based, therefore, on the number of patients requiring pathology, surgery, chemotherapy and radiation therapy (Table B). This number is estimated from the percentage of patients requiring surgery, chemotherapy and/or radiation therapy for the top ten cancers in both men and women.

For developing countries the International Atomic Energy Agency (IAEA) recommends training radiation/clinical oncologists who can prescribe both radiation and chemotherapy for the common solid cancers, instead of separate medical and radiation oncologists. Hematological malignancies are treated primarily by hematologist-oncologists. The number of specialists needed is based upon the number of cancer patients but each city, in order to ensure coverage if one person leaves or goes on vacation, must have at least 2 surgical oncologists, 2 radiation/clinical oncologists, 2 hematologist oncologists, etc.

Table B: Number of oncologists needed for China's two most populous cities based on 2010 population estimates (http://citypopulation.de/) and 2008 Globocan data for new cancer cases (http://globocan.iarc.fr/).

	New Cancer Cases	Hematologist Oncologists	Surgical Oncologists	Radiation / Clinical Oncologists	Urologic Oncologists	Gynecologic Oncologists	Pathologists
Shanghai	42351	4	38	212	4	6	85
Beijing	34452	3	31	173	4	5	69

In addition to oncologists, support staff such as onco-pharmacists, pharmacy technicians, oncology nurses and palliative care specialists is also needed. Many cancer patients require hospitalization for diagnosis, treatment and/or complications, therefore an adequate number of oncology beds will be needed. The number of oncology nurses, onco-pharmacists and pharmacy technicians needed is based upon the number of beds occupied daily by cancer patients while the number of palliative care specialists is based on the number of new cancer cases per year (Table C). The oncology nursing staff for each 24-bed oncology unit (operating 24 hours a day, 7 days a week) comprises of one head nurse and a nurse specialist as well as 13 nurses working 8 hour shifts, 5 days per week.

Table C: Number of oncology Units, oncology nursing and pharmacy staff needed for China's two most populous cities based on 2010 population estimates (http://citypopulation.de/) and 2008 Globocan data for new cancer cases (http://globocan.iarc.fr/).

	New Cancer Cases	Oncology Beds/Day	24 bed Oncology Wards	Onco- Pharmacists	Pharmacy Technicians	Palliative Care Specialists	Oncology Ward Nurses
Shanghai	42351	708	30	120	180	85	450
Beijing	34452	576	24	96	144	69	360

Since many cancer patients require radiotherapy, appropriately equipped facilities will be needed along with radiation oncology staff (Tables D and E). Radiation oncology staff includes radiation therapy technicians, medical physicists, Linac engineers and radiation oncology nurses in addition to

radiation/clinical oncologists. The minimum radiation therapy equipment requirements are at least one of each: Linac, brachytherapy unit, CT simulator, treatment planning computer and dosimetry/quality assurance package.

Table D: Radiation Therapy Staff needed for China's two most populous cities based on 2011 population estimates (http://citypopulation.de/) and 2008 Globocan data for new cancer cases (http://globocan.iarc.fr/).

	New Cancer Cases	Radiation / Clinical Oncologists	Radiation Therapy Technicians	Medical Physicists	Linac Engineers	Radiation Oncology Nurses
Shanghai	42351	212	285	95	24	95
Beijing	34452	173	232	78	20	78

Table E: Radiation Therapy Equipment needed for China's two most populous cities based on 2011 population estimates (http://citypopulation.de/) and 2008 Globocan data for new cancer cases (http://globocan.iarc.fr/).

	New Cancer Cases	Linac / Co 60 Megavolt Unit	Brachytherapy Units	CT Simulators	Treatment Planning Computers	Dosimetry /QA Packages
Shanghai	42351	48	24	24	24	24
Beijing	34452	39	20	20	20	20

**NOTE:** Guidelines from the IAEA of the United Nations were used to calculate the radiation therapy equipment and staff needed in the setting of a developing China. Guidelines from the Oncology Nursing Society were used to calculate the number of nurses needed. Several other specialty societies were also requested to provide guidelines but in most cases there were none, therefore colleagues active in those fields were consulted for estimating the number of staff needed.